

Marine and Atmospheric Sciences (MAS)**Dean and Director**

Minghua Zhang, Endeavour Hall 145 (631) 632-8700

Graduate Program Director

Anne McElroy, Dana Hall 113 (631) 632-8488

Director Institute of Terrestrial and Planetary Atmospheres and Coordinator of Atmospheric Sciences Program Sultan Hameed, Endeavour Hall 131 (631) 632-8319

Academic Coordinator Marine Conservation and Policy Program

Lesley Thorne, Challenger Hall 143 (631) 632-5117

Graduate Program Coordinator

Carol Dovi, Endeavour Hall 105 (631) 632-8681

Degrees Awarded

M.A. in Marine Conservation and Policy; M.S. in Marine and Atmospheric Science; Ph.D. in Marine and Atmospheric Science; M. Phil. in Marine and Atmospheric Science; Graduate Certificate in Oceanic Science; Graduate Certificate in Environmental Management

Web Site

<http://www.somas.stonybrook.edu/>

Marine and Atmospheric Science

The Marine and Atmospheric Sciences (MAS) graduate program is located within the School of Marine and Atmospheric Sciences (SoMAS). Research activities within SoMAS are coordinated through the Marine Sciences Research Center (MSRC), and the Institute for Terrestrial and Planetary Atmospheres (ITPA). MSRC is the center for research, graduate education, and public service in the marine sciences for the entire State University of New York system. SoMAS faculty have active research programs in all major oceanographic and atmospheric disciplines and many focus on interdisciplinary approaches to understanding environmental processes and issues. Specific areas of cross-disciplinary focus include: biogeochemical transformation of energy and elements, conservation and management of marine resources, environmental health and contaminants, environmental modeling and prediction, and patterns and impacts of global climate change.

SoMAS is ideally situated for studies of a variety of coastal environments including estuaries, lagoons, salt marshes, barrier islands, and continental shelf waters. Long Island has a greater diversity of coastal environments in a limited geographical range than any other comparable area in the United States. The proximity of New York City and the burgeoning population of Long Island and Connecticut make New York coastal waters an excellent laboratory for assessing human impacts on the coastal seas, and understanding land/sea interactions at all levels. In addition to working on coastal issues, SoMAS scientists have active research programs on all the world's oceans and ITPA faculty examine atmospheric processes on the Earth and other planets.

SoMAS offers a M.A. in Marine Conservation and Policy and an M.S. and Ph.D. in Marine and Atmospheric Sciences with concentrations in either oceanography or atmospheric sciences. Interested students should address inquiries to the graduate program director. Tuition scholarships and stipends are available for students in the research based M.S. and Ph.D. programs.

Graduate Degree Program Descriptions**The M.A. Program in Marine Conservation and Policy**

The Graduate Program in Marine Conservation and Policy will provide students with an understanding of contemporary marine conservation issues and help them develop the necessary skills to apply this knowledge in marine conservation positions that require advanced training and a broad skill-set, but are not research-based. Graduates of this program should be able to compete effectively for positions in government, environmental consultancy and non-governmental organizations, and to apply marine conservation and policy knowledge in other fields such as law, teaching, communications or business. This program requires a minimum of 30 credits of graduate coursework and is designed to be completed in 12 months of full time study.

The M.S. Program in Marine and Atmospheric Sciences

The M.S. program offered by SoMAS consists of a rigorous interdisciplinary approach to oceanography and atmospheric sciences based on interdisciplinary course work and a research thesis. It is designed to prepare students for positions in research, management, environmental protection, and resource development. The program provides students with a firm basis for more advanced study, but more importantly, it is designed to equip students with the background and tools needed for effective careers without additional training. Required course work is identical to the Ph.D. program allowing M.S. to continue on in the Ph.D. program provided they have demonstrated adequate performance and found a suitable faculty advisor. The time required to complete this program depends on the scope of research undertaken. Most students complete their degree in 2-3 years.

Ph.D. Program in Marine and Atmospheric Sciences

The Ph.D. program is designed to prepare students to independently identify and attack oceanographic and atmospheric problems. It builds on a series of core required courses (taken by both PhD and M.S. students), and allows students to create their own course of advanced study, helping them to become effective, independent problem solvers. The Ph.D. in Marine and Atmospheric Sciences prepares students to compete effectively for academic positions, direct research programs at government or private laboratories, and direct research and assessment programs at non-governmental organizations. A M.S. degree is not required for admission to the Ph.D. program. Most students take 5 to 6 years to complete their Ph.D. in program.

Certificate Programs

In addition to the M.A., M.S. and Ph.D. programs of study, certificate programs provide the opportunity for advanced study for students who do not wish to pursue a degree. Students interested in either of these programs should contact the Graduate Program Director.

Graduate Certificate Program in Environment Management

SOMAS is the home of the Waste Reduction and Management Institute, dedicated to lessening the impacts of a complex array of wastes through research, environmental assessment, public outreach, and policy analysis. A Graduate Certificate in Environmental Management is administered by the School of Professional Development. The 18-credit program provides access to the most current expertise in waste management essential to working effectively in professional careers or public service. The certificate may also be incorporated into the degree of Professional Studies with a concentration in environmental management. For further information refer to the School of Professional Development section in this bulletin.

Advanced Graduate Certificate Program in Oceanic Science

The advanced graduate certificate program in Oceanic Science is designed to make the unique resources of the SOMAS available to professionals as well as to scholars both within the SUNY system and at other institutions as well as other professionals. Students admitted to this program complete two full-time semesters (18 credits) of intensive, specialized graduate studies in our core curriculum, or the equivalent, under the supervision of a faculty sponsor. The program is intended to supplement a student's primary educational and professional goals providing the student with a broad background in oceanography as well as opportunity for in-depth course work in highly specialized topics. For further information, contact the SoMAS Graduate Program Director.

Gainful Employment Regulation Disclosures**Admission Requirements**

All students must meet the general requirements of the Graduate School which include:

- A. Completion of a B.A. or B.S. with a cumulative grade point average of at least 3.0 (B);
- B. Acceptable scores on the Graduate Record Examination (GRE) General Test;
- C. Acceptable scores on the TOEFL (paper: 600, computer: 230, iBT: 90) or IELTS (6.5) for foreign students;
- E. Three letters of recommendation;
- F. Official transcript(s);

All applications should be submitted electronically through the Graduate School.

For admission to the M.A. program, students must have completed at least 4 semester college courses in math or science, including at least one course in biology.

There are two tracks in the M.S. and Ph.D. programs—one in Marine Sciences and one in Atmospheric Sciences. Students should indicate which track they wish to pursue on their applications.

For admission to either the M.S. or Ph.D. graduate programs in Marine and Atmospheric Sciences, the following are normally required:

- A. B.A. or B.S. degree in atmospheric sciences, biology, chemistry, geology, mathematics, physics, or other suitable science discipline, the coursework equivalent to obtain such a degree;
- B. Two semesters of coursework in mathematics through calculus, physics, and chemistry, and as appropriate to specialization area, biology or earth sciences, with advanced work in at least one of these disciplines;

In their personal statements, all students should state why they wish to enter the specific SoMAS graduate program and what career they hope to embark upon. In addition, M.S. and Ph.D. students should provide an indication of both the specific research areas they would like to address and potential faculty advisors. Obtaining a position in specific research laboratories is very competitive, so applicants are encouraged to contact potential advisors prior to submitting their application.

Facilities

The main laboratories and offices of SoMAS are housed in a cluster of buildings on South Campus with more than 8,000 square meters of usable floor space. Laboratories are well equipped for most analyses, and students and faculty have access, with special arrangements, to nearby Brookhaven National Laboratory (BNL) and Cold Spring Harbor Laboratory. Center and University computing facilities are excellent and include the new 100 TFlop IBM Blue Gene supercomputer recently installed at BNL. In addition to ITPA, SoMAS is home to the Institute for Ocean Conservation Sciences, the Marine Animal Disease Laboratory, a diagnostic and research facility focused on the health of living marine resources, the Waste Reduction and Management Institute, the Living Marine Resources Institute, the Long Island Groundwater Institute, the New York Sea Grant College Program, and several analytical facilities. The Blue Ocean Institute also maintains an office at SoMAS. MASIC

(the Marine and Atmospheric Sciences and Information Center) is the branch of the campus library system located at SoMAS. Officially designated as a prototype for technology-based branch libraries on the campus, MASIC offers students and faculty a core collection of journals and monographs relevant to the multi-disciplinary pursuits of SoMAS and its affiliated institutes as well as a state-of-the-art computer teaching laboratory.

SoMAS manages the Flax Pond Marine Laboratory located on a 0.6 square kilometer salt marsh approximately seven kilometers from campus. This facility provides flow-through seawater and space suitable for culture and experimentation on living marine resources. Part of the facility is in a green house offering ambient light and temperature conditions. Laboratory and sea-table space are available to faculty and students at SoMAS and other collaborating university programs. SoMAS also manages the newly renovated marine station at Stony Brook Southampton, located 46 miles away on the beautiful east end of Long Island. State of the art class rooms, laboratories and animal culture facilities are available in the new Southampton Marine Station. Several SoMAS faculty keep research laboratories at Stony Brook Southampton, and additional wet lab space is available in the new Marine Station for student and faculty research.

SoMAS operates a fleet of research vessels, the largest of which is the R/V SEAWOLF, a 24-meter research vessel designed specifically for oceanographic research. The SEAWOLF is ideally suited for extended research trips, large-scale oceanographic sampling, and trawling. Several other smaller boats are available for local cruises out of either the Stony Brook or Southampton campuses.

Requirements for the M.A. Degree in Marine Conservation and Policy

In addition to the minimum Graduate School requirements, the following are required:

Skill Area Requirements - 9 courses in 6 different areas (A-F)

- A) Marine Sciences: 2 courses, one of which has to be in a basic biological field
- B) Conservation: 2 courses, MAR 507 Marine Conservation Biology (req.), plus 1 elective
- C) Communications: 2 required courses: MAR 557 Case Study and Project Planning Seminar, and a Journalism Course (either JRN 500, or JNR 501,502,503, 504, 505))
- D) Policy/law/economics/management: 1 course
- E) Quantitative assessment: 1 course
- F) Field biology: 1 course
- G) Capstone Project or Internship in Marine Conservation and Policy, MAR 583 or MAR 592) 6 credits required; can be completed during summer session, or during academic year.
- H) Students make an oral presentation of their Capstone Project or Internship and submit a project or internship report.

Requirements for the M.S. Degree in Marine and Atmospheric Sciences

In addition to the minimum Graduate School requirements, the following are required:

- A. An overall B (3.0) average in the required foundation and advanced core courses with no grade lower than a C. See details of required coursework below;
- B. Seminar MAR 580 (two semesters);
- C. Master's research proposal due by end of first year, signed by advisor and two readers;
- D. Sea experience or appropriate field experience for students in the marine track only;
- E. Oral presentation of thesis work;
- F. Submission of approved thesis.

The M.S. degree requires a minimum of 30 credits, composed of at least 10 credits of thesis research in addition to required and elective course work.

Requirements for Ph.D. Degree in Marine and Atmospheric Sciences

In addition to the minimum Graduate School requirements, and general requirements for the M.S. Degree, the following are required:

- A. Comprehensive Examination: The primary purpose of the Comprehensive Examination is to assess the student's knowledge of his or her field and the student's ability to relate his or her specific research interests to the broader field. The student must demonstrate a general knowledge of oceanography or atmospheric sciences, including an understanding of the current concepts of his or her field. Success on the examination implies the ability to use this information to address questions of a multidisciplinary nature;

B. Ph.D. degree dissertation proposal approved by a dissertation committee and oral preliminary examination;

C. Practicum in teaching;

D. Oral defense of dissertation;

E. Submission of approved dissertation.

Required Courses

Marine Track:

A. Core Courses: : MAR 508 and MAR 509, Foundations of Marine Sciences I and II; 2) One of the following advanced core courses depending on discipline (MAR 501 Physical Oceanography, MAR 502 Biological Oceanography, MAR 503 Chemical Oceanography, or MAR 506 Geological Oceanography); and 3) One quantitative analysis course from among appropriate offerings at SoMAS or in other departments.

B. Scientific Communication MAR 568;

C. A minimum of six additional credits in specialty courses selected by the student and his or her advisor and approved by the advisor;

D. Four credits of seminar style elective courses (Ph.D. students only);

Atmospheric Track:

A. Core courses: 1) MAR 541 and MAR 542, Foundations of Atmospheric Sciences I and II; 2) One of the required oceanography core courses (MAR 501, MAR 502, MAR 503, or MAR 506); and 3) Two or three out of the five following advanced courses, for M.S. and Ph.D. students respectively (MAR 593 Atmospheric Physics, MAR 594 Atmospheric Dynamics, MAR 544 Atmospheric Radiation, MAR 596 Atmospheric Chemistry and MAR 598 Synoptic and Mesoscale Meteorology);

B. MAR 595 Graduate Seminar in Atmospheric Sciences (two semesters);

C. Minimum of 24 course credits for Ph.D. students.

Faculty

Distinguished Professors

Aller, Robert C., Ph.D., 1977, Yale University: Marine geochemistry; marine animal-sediment relations.

Cess, Robert D., Emeritus, Ph.D. 1959, University of Pittsburgh: Atmospheric Sciences.

Fisher, Nicholas S. Ph.D., 1974 State University of New York at Stony Brook: Marine biogeochemistry of metals, marine pollution, phytoplankton, herbivore interactions.

Lee, Cindy, Ph.D., 1975, University of California, San Diego (Scripps): Marine geochemistry of organic compounds; organic and inorganic nitrogen cycle biochemistry.

Distinguished Service Professors

Bowman, M.J., Ph.D., 1971, University of Saskatchewan, Canada: Coastal dynamics; oceanic fronts; productivity and physical processes.

Bokuniewicz, Henry J., Ph.D., 1976, Yale University: Near shore transport processes; coastal sedimentation; marine geophysics.

Professors

Aller, Josephine Y., Ph.D., 1975, University of Southern California: Marine benthic ecology; invertebrate zoology; marine microbiology; biogeochemistry.

Chang, Edmund K.M., Ph.D., 1993, Princeton University: Atmospheric dynamics and diagnoses climate dynamics; synoptic meteorology.

Cochran, J. Kirk, Ph.D., 1979, Yale University: Marine geochemistry; use of radionuclides as geochemical tracers; diagenesis of marine sediments.

Colle, Brian A., Ph.D., 1997, University of Washington: Synoptic meteorology; mesoscale numerical modeling and forecasting; coastal meteorology

Conover, David O., Ph.D., 1981, University of Massachusetts: Ecology of fishes; fisheries biology.

Flood, Roger D., Ph.D., 1978, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Marine geology; sediment dynamics; continental margin sedimentation.

Geller, Marvin A., Ph.D., 1969, Massachusetts Institute of Technology: Atmospheric dynamics; climate and the upper atmosphere.

- Gobler, Christopher, Ph.D. 1999, Stony Brook University: Phytoplankton, harmful algal blooms, estuarine ecology, aquatic biogeochemistry.
- Hameed, Sultan, Coordinator of Atmospheric Sciences Program. Ph.D., 1968, University of Manchester, England: Atmospheric sciences.
- Lonsdale, Darcy J., Ph.D., 1979, University of Maryland: Zooplankton ecology with special interest in physiology; life history studies.
- Lopez, Glenn R., Ph.D., 1976, Stony Brook University: Benthic ecology; animal-sediment interactions.
- McElroy, Anne E., Ph.D., 1985, Massachusetts Institute of Technology, Woods Hole Oceanographic Institute: Aquatic toxicity, fate and effects of organic contaminants.
- Pikitch, Ellen, K. Ph.D., 1983, Indiana University: Fisheries science, conservation biology and marine policy
- Scranton, Mary I., Ph.D., 1977, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Marine biogeochemistry; geochemistry of reduced gases; chemical cycling in anoxic systems.
- Swanson, R. Lawrence, Ph.D., 1971, Oregon State University: Physical oceanography of coastal waters and estuaries; ocean dumping; coastal zone management.
- Taylor, Gordon T., Ph.D., 1983, University of Southern California; Marine microbial ecology; microbial mediation of biogeochemical processes; biofouling.
- Zhang, Minghua, Ph.D., 1987, Institute for Atmospheric Physics, Academia Sinica, Beijing: Atmospheric sciences; modeling of climate.
- Associate Professors
- Allam, Bassem, Ph.D., 1998, University of Western Brittany, France: Diseases of shellfish.
- Armstrong, Robert A., Ph.D., 1975, University of Minnesota: Marine ecosystem ecology; marine biogeochemistry; population and community ecology.
- Brownawell, Bruce J., Ph.D., 1986, Massachusetts Institute of Technology, Woods Hole Oceanographic Institution: Biogeochemistry of organic pollutants in seawater and groundwater.
- Cerrato, Robert M., Ph.D., 1980, Yale University: Benthic ecology; population and community dynamics; recolonization.
- Collier, Jackie L., Ph.D., 1994, Stanford University: Phytoplankton physiology and ecology; freshwater and marine plankton; molecular microbial ecology.
- Frisk, Michael, Ph.D., 2004, University of Maryland: Biology, life history, and conservation of elasmobranches.
- Khairoutdinov, Marat, Ph.D. 1997, University of Oklahoma: Climate modeling, high resolution cloud modeling, cloud microphysics, super parameterization, massively parallel super-computing, cloud parameterization.
- Knopf, Daniel A., Ph.D., 2003, Swiss Federal Institute of Technology, Switzerland: Atmospheric Chemistry, Microphysics and Chemistry of Atmospheric Aerosols, Heterogeneous Atmospheric Chemistry and Kinetics, Instrument Development.
- Lwiza, Kamazima M.M., Ph.D. 1990, University of Wales: Structure and dynamics of shelf seas.
- Mak, John E., Ph.D., 1992, University of California, San Diego (Scripps): Atmospheric chemistry and biosphere-atmosphere interactions; isotope geochemistry.
- Peterson, Bradley, Ph.D. 1998, University of South Alabama: Community ecology of seagrass dominated ecosystems.
- Warren, Joseph, Ph.D., 2001, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution: Acoustical oceanography, zooplankton behavior and ecology.
- Wilson, Robert E., Ph.D., 1973, Johns Hopkins University: Estuarine and coastal ocean dynamics.

Assistant Professors

- Black, David E., Ph.D., 1998, Rosenstiel School of Marine and Atmospheric Science, University of Miami: Paleoclimatology, paleoceanography, deep-sea sediments, marine micropaleontology.
- Kim, Hyemi, Ph.D. 2008, School of Earth and Environmental Sciences, Seoul National University: Low frequency climate variability, tropical meteorology, ocean-atmosphere interaction, prediction and predictability, tropical cyclone activity, extreme events.
- Nye, Janet. {j/D/. 2008, University of Maryland: Fish ecology, climate variability, global environmental change, ecosystem-based management.
- Zhu, Qingzhi, Ph.D., 1997, Xiamen University, China: Biogeochemistry, Environmental Analytical Chemistry, Trace Elements, Sensor.

Joint Faculty

Akcakaya, Resit. Ph.D. 1989, Stony Brook University: Ecological risk assessment, metapopulation modeling, population viability analysis, threatened species assessment, uncertainty analysis.

Baines, Stephen, Ph.D. 1993, Yale University: Aquatic biogeochemistry of carbon and trace elements. Assistant Professor, Ecology and Evolution

De Zafra, Robert. Emeritus. Ph.D., 1958, University of Maryland: Positron annihilation. Physics.

Koppelman, Lee E., Ph.D., 1970, Cornell University: Coastal zone management; planning; policy studies. Center for Regional Policy Studies

Levinton, Jeffrey, Ph.D. 1971, Yale University: Marine ecology. Professor Ecology and Evolution

Padilla, Diana, Ph.D. 1987, University of Alberta: Mollusc ecology; invasive species.

Reaven, Sheldon, Ph.D., 1975, University of California, Berkeley: Energy and environmental problems; waste management; science and society.

Adjunct Faculty

Ammerman, James, Ph.D. 1983, Scripps Institution of Oceanography: Aquatic microbial ecology and biogeochemistry. Interests in microbial cell-surface enzymes, phosphorus cycling, and automated instrumentation for aquatic microbiology.

Baumann, Hannes, Ph.D., 2006, University of Hamburg: Evolutionary fish ecology.

Bluestein, Howard, Ph.D. 1976, MIT: Professor of Meteorology.

Buonaiuto, Frank, Ph.D. 1999, Stony Brook University: Coastal processes, numerical modeling of waves, tides and sediment transport.

Bowser, Paul, Ph.D. 1978, Auburn University: Fish pathology.

Breninkmeijer, Carl, Ph.D. 1983 University of Groningen, Netherlands Atmospheric Chemistry.

Cahill, Michael J. , JD 1978, DePaul: Application and development of environmental law in local government.

Chistoserdov, Andre Y. Ph.D., 1985, Institute of Genetics and Selection of Industrial Microorganisms, Russia: Marine microbiology; molecular genetics of methylotrophic bacteria; marine biotechnology and bioremediation.

Dove, Alistair, Ph.D. 1999, University of Queensland: Parasites and diseases of marine organisms.

Engel, Anga: Organic matter cycling marine gel particles, ocean acidification.

Espinosa, Emmanuelle pales, Ph.D. 1999. University of Nante, France: Shellfish physiology, particle selection mechanisms in suspension-feeding bivalves, algology.

Fast, Mark D. Ph.D. 2005, Dalhousie University, Canada: Aquatic diseases and immunology.

Ferson, Scott, Ph.D. 1988, Stony Brook University: Risk assessments and uncertainty analysis.

Flagg, Charles, Ph.D. 1977, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution: Structure and dynamics of coastal oceans

Fowler, Scott, Ph.D. 1969. Zooplankton ecology, biogeochemistry of metals, marine pollution, radioecology, ecotoxicology.

Goodbred Jr., Steven, Ph.D. 1999. Coastal and marine sedimentology, Quaternary development of continental margins, salt-marsh processes and responses.

Karimi, Roxanne, Ph.D., 2007, Dartmouth College: Environmental health, freshwater and marine pollutants, ecological stoichiometry, physiological ecology.

Kavanagh, Kathryn, Ph.D., 1998, James Cook University, Australia

Letherman, Stephen P., 1975, University of Virginia: Coastal geomorphology.

Lin, Wuyin , Ph.D., 2002, Stony Brook University: Climate Modeling, climate change.

Munch, Stephan, Ph.D., 2002, Stony Brook University: Evolutionary ecology of growth and life history traits, evolution in harvested populations, applied population dynamics modeling, mathematical modeling and statistics.

Rierner, Nicole, Ph.D., 2002, University of Karlsruhe, Germany: Cloud microphysics, aerosol physics and chemistry

Roethel, Frank, Ph.D. Stony Brook University: Environmental chemistry, Municipal solid waste management impacts.

Safina, Carl, Ph.D., 1987, Rutgers University: Marine vertebrates, fisheries policy, and raising awareness of ocean change.

Vogelmann, Andrew, Ph.D., 1994, The Pennsylvania State University: Meteorology, Climate and atmospheric radiative transfer.

Wang, Dong-Ping, Ph.D., 1975, University of Miami: Coastal ocean dynamics.

Wang, Jian, Ph.D., 2002, California Institute of Technology.

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.